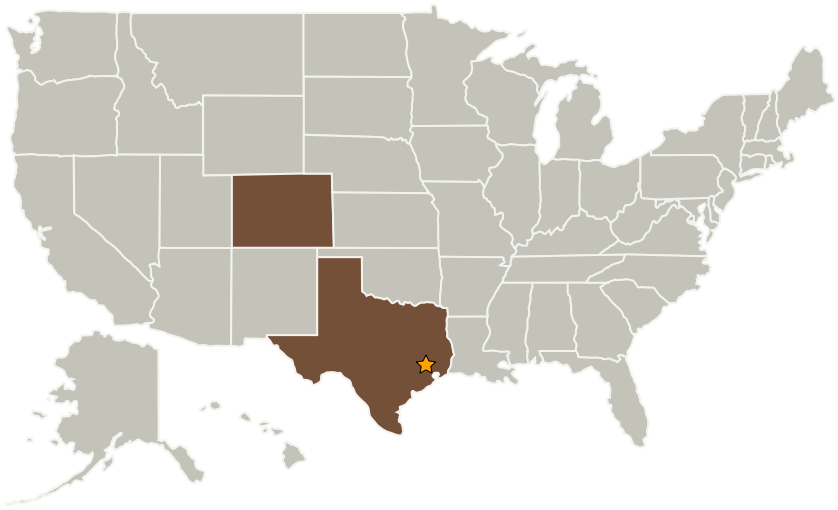
Novel Liquid Membranes for CO2 and H20 Control in EVA Applications, Phase I

Completed Technology Project (2009 - 2009)

Project Introduction

The development of new, robust, lightweight systems for CO2 removal during EVA is a crucial need for NASA. With current activity focused on the development of Lunar outposts, mission times will need to be extended without increasing the size and weight of the portable life support system (PLSS). While much of the recent work on the development of new CO2 control strategies has centered on sorbents that can be regenerated during the mission, these system add "on back" hardware, increasing weight and complexity, and reducing reliability. A simpler approach is to use a membrane system to separate CO2 and H2O from the O2 environment. Unfortunately, separating gas phase molecules with the needed selectivity is difficult with standard membrane materials. However, converting CO2 and H2O to compounds with much different properties, could allow the needed separation to be achieved. Therefore in this Phase I project, Reaction Systems will develop a liquid membrane that will have high permeance and selectivity for CO2 and H2O compared to O2, resulting in a TRL = 4. In Phase II we will advance the TRL to 6 by designing and constructing a full scale prototype, which will be delivered it to NASA.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Reaction Systems, LLC	Supporting Organization	Industry	Golden, Colorado

Primary U.S. Work Locations	
Colorado	Texas

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
    - TX06.1.1 Atmosphere Revitalization